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ABSTRACT

Because second grade students had difficulty in explaining what they knew about the number 15, it was suspected that they did not understand place value. Realizing every number has a place value and its place provides facility for calculation, a teacher attempted to ascertain second grade students' (N=18) knowledge of place value. Results of individual interviews indicate that 72 percent of these students did not understand the meaning of place value, although they understood counting by ones. Since much time is spent teaching place value in the first grade, students in grades 1 (N=40), 2 (N=13), 3 (N=18), and 4 (N=18) were also interviewed to determine when children do learn place value. Results indicate that students show an understanding of place value in grade 4 whereas, even though it is taught in earlier grades, there appears to be little or no understanding. Therefore, it is recommended that teachers need to spend more time in helping students develop the ability to think through the use of concrete materials. (JN)

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WHEN DO CHILDREN UNDERSTAND THE CONCEPT OF PLACE VALUE?

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When Do Children Understand the Concept of Place Value?

The second grade teacher exclaimed, "Why can't my students add and subtract correctly?" In the search of why, the teacher wrote the symbol for fifteen on a piece of paper and asked, "Look at this number, tell me about this number." Answers included, "Fifteen", "Just 15", "What do you mean?" "I don't know", "I don't get you" or a shrug of the shoulder. Again the teacher pointed to the number, first the five and asked, "What is this number?" "Five", came the answer. She then pointed to the one; she heard, "One". She then asked, "One what" she saw puzzled looks; then came an answer, "Just one." Could it be students in my class do not understand place value, she asked herself? Realizing every number has a place value and its place provides facility for calculation, the teacher decided she would attempt to ascertain her second graders knowledge of place value.

The procedure the teacher used included 15 counters all alike. She asked the student to draw a picture of the counters and then count the counters. The next step was to write the number that tells how many counters you have drawn. The teacher then said pointing to the five, "Place a ring around the counters that tells how many counters are equal to this number." Then the teacher pointed to the one, the same question was asked. The last question asked was, "How many counters do you see in all?" This procedure was administered to each student in an individual interview.

Chart I indicates the findings for grade two students

Chart I

Understanding of Five		Understanding of One		Understanding of 15	
Did	Did Not	Did	Did Not	Did	Did Not
13	0	5	13	16	2

Chart I indicates 72% of the second grade class did not understand the meaning of place value although they understood counting by ones. There are many algorithms that require regrouping and second graders often experience difficulty in the process. Many errors appear through the apparent lack of the understanding of place value. Furthermore students demonstrate the lack of understanding of place value when they show the inability to know if an answer to a problem is reasonable.

The teacher questioned, When do children learn place value? Much time is spent teaching place value in first grade. Chart II indicates the findings of 91 students' knowledge of place value in grades 1 - 4. All children interviewed were in the same large urban school.

CHART II

PLACE VALUE UNDERSTANDING						
	Understanding of Five		Understanding of One		Understanding of 15	
	Did	Did not	Did	Did not	Did	Did not
Gr. 1	37	3	14	26	36	4
Gr. 2	18	0	5	13	16	2
Gr. 3	18	0	2	16	16	2
Gr. 4	18	0	18	0	15	3
Total	91	3	39	55	83	11

Chart II indicates students show an understanding of place value in Grade 4 whereas even though it is taught in earlier grades there appears to be little or no understanding.

It would seem teachers need to spend more time in helping students develop ability to think through the use of materials. Students need to count straws and bundle. Bundling of straws, paper strips, or pipe cleaners in groups of ten provide an observable behavior of understanding. Later students can use pre-grouped material such as bean sticks, place value blocks. When place value blocks are not available graph paper can be used. Exchange material such as the abacus and chip trading further demonstrate understanding. These materials should be used in sequential order before the usual pencil-paper work. Children need to be able to think for themselves. If there is understanding, there would be no need for ridiculous errors.

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